REMARKS

Claims 1-36 stand rejected on prior art grounds and the Applicants respectfully traverse these rejections based on the discussion below. Claims 13-17, 19-23, 25-29, and 32-36 stand objected to as being of improper dependent form and have been amended herein to overcome this objection. Claims 18-23 stand rejected upon informalities and are herein cancelled. The limitations of dependent claims 4, 9, 15, 27 and 34 have been amended into their respective independent claims. Thus, claims 4, 9, 15, 27 and 34 are also cancelled. Claims 37-44 are newly added. Therefore, claims 1-3, 5-8, 10-14, 16-17, 24-26, 28-33 and 35-44 are all the claims presently pending in the application.

I. The 35 U.S.C. §112, First Paragraph, Rejection

Claims 18-23 stand rejected under 35 U.S.C. §112, first paragraph. As mentioned above, these rejections are herein cancelled and, thus, the rejection is moot.

II. The Prior Art Rejections

Claims 1-36 stand rejected under 35 U.S.C. §102(e) as being anticipated by Papadopoulou, et al. (U.S. Patent No. 6,178,539), hereinafter referred to as Papadopoulou. Applicants respectfully traverse these rejections because Papadopoulou does not teach or suggest the several of the patentable features of the invention.

Specifically, Papadopoulou does not teach or suggest the features in independent claim 1 of: "defining said cost functions in terms of critical area contributions of linear bisectors between

said edges of said device shapes" and "wherein a critical area contribution of a given linear bisector is proportional to a cross product of an x-y difference vector between normal vectors of planes of Vornoi cells which meet at said given linear bisector and an x-y difference vector representing a length of said given linear bisector such that said critical area contribution of said given linear bisector is a function of said variables." Papadopoulou also does not teach or suggest the same or similar features found in amended independent claims 6, 12, 24, 30 and 31 and in newly added independent claims 37 and 41.

Per the Abstract, Papadopoulou teaches a method for computing critical area for shorts of a layout and includes the steps of computing a Voronoi diagram for the layout, computing a second order Voronoi diagram to arrive at a partitioning of the layout into regions, computing critical area within each region and summing the critical areas to arrive at a total critical area for shorts in the layout. However, per column 3, lines 44-62, regions are decomposed into shapes for calculating critical areas and these critical areas are calculated as a function of defect density.

Contrarily, in the present invention, critical area contributions are framed not as defect densities but rather based on the positions and orientations of the edges of the device shapes and, specifically, on the coordinates of the vertices of linear bisectors between those edges (i.e., a difference of two positions along the x-axis and a difference of two positions along the y-axis (width AC and width BD of a given linear bisector)) (see paragraphs [0064]-[0066]). That is, per paragraph [0066], the "critical area contribution of each Vornoi bisector is proportional to the cross product of two vectors the x-y difference vector between the normal vectors of the planes which meet at the bisector, and the x-y difference vector representing the length of the bisector" and the "factor of proportionality is some constant times the logarithm of the z-coordinates of the

vertices of the bisector divided by the different in the z-coordinates of the vertices of the bisector." Thus, the cost functions of the present invention are distinctly different from Papadopoulou which uses defect densities. Furthermore, having expressed the critical area contribution of a Vornonoi bisector as a function of edges in the design (rather than defect densities) enables the present invention to predict change in critical areas as a result of layout modifications (see paragraph [0067]) and further enables the invention to perform an optimization process (e.g., using a linear optimization algorithm) to revise (i.e., modify) the design layout in order to reduce the critical area contribution cost (see paragraphs [0074]-[0078] and [00098]).

The cited prior art reference also does not teach or suggest the feature in amended independent claims 6, 12 and 31 of "optimizing said positions and lengths of said edges of said device shapes in said integrated circuit design to reduce critical area contribution cost in a first direction across said integrated circuit design to produce a revised integrated circuit design by using a linear optimization algorithm" or the similar feature in newly added claims 37 and 41 of "using a linear optimization algorithm to modify said layout of said device shapes such that a sum of said costs for all of said linear bisectors is minimized". The Office Action cites col. 3, line 6-35 and col. 7 line 60 to col. 8, line 16 of as disclosing this optimization step. The Applicants respectfully disagree.

The cited portions of col. 3 of Papadopoulou refer to computing the critical area of different regions (e.g., regions associated with shapes having edges with a slop of +-1 or horizontal or vertical edges) and summing the critical areas. The cited portion of columns 7 and 8 of Papadopoulou similarly refer to the computation of critical area for shorts in a circuit layout.

Thus, the cited portions of Papadopoulou simply refer to computing the critical areas for a fault in a circuit layout, not to performing an optimization step to produce a revised circuit layout with a reduced cost. Specifically, no where in the cited portions does it refer to "optimizing said positions and lengths of said edges of said device shapes in said integrated circuit design to reduce critical area contribution cost in a first direction across said integrated circuit design to produce a revised integrated circuit design by using a linear optimization algorithm" or to "using a linear optimization algorithm to modify said layout of said device shapes such that a sum of said costs for all of said linear bisectors is minimized."

Therefore, amended independent claims 1, 6, 12, 24, 30 and 31 as well as newly added independent claims 37 and 41 are patentable over Papadopoulou. Further, dependent claims 2-3, 5, 8, 10-11, 13-14, 16-17, 25-26, 28-29, 32-33, 35-36, 38-40 and 42-44 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. Moreover, the Applicants note that all claims are properly supported in the specification and accompanying drawings, and no new matter is being added. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections.

II. Formal Matters and Conclusion

With respect to the rejections to the claims, the claims have been amended, above, to overcome these rejections. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections to the claims.

In view of the foregoing, Applicants submit that claims 1-3, 5-8, 10-14, 16-17, 24-26, 28-33 and 35-44, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary. Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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